

REMARKS

The Office Action dated April 6, 2005, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

New claim 36 is added. No new matter is added, and support for the new claim may be found throughout the specification, for example, on page 10. Claims 12-36 are pending in the present application and are respectfully submitted for consideration.

Claims 12-17, 19, 23-24 and 27-34 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by European Patent Application Publication EP 0 847 146 A2 (Endo et al.). The Office Action took the position that Endo taught all the elements of these claims. Applicants respectfully traverse the anticipation rejection and submit that the cited reference does not disclose or suggest all the features of any of the presently pending claims.

Claim 12, upon which claims 13-17, 19 and 23 are dependent, recites a method for controlling transmission power in a radio system having a transmitting end and a receiving end. The method includes transmitting a digital signal from the transmitting end to the receiving end. The method also includes receiving the digital signal at the receiving end. The method also includes setting an initial value of the transmission power so that no pseudo errors are detected. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The method also

includes monitoring pseudo error occurrence in the received signal at the receiving end. The method also includes decreasing the transmission power gradually from the initial value at the transmission end when the pseudo error occurrence in an error-free reception does not fulfill a predetermined condition. The method also includes increasing the transmission power by a predetermined amount when the pseudo error occurrence in the error-free reception fulfills the predetermined condition.

Claim 24 recites a radio system. The radio system includes, at a receiving end, first means adapted to monitor pseudo error occurrence in a received signal and to produce a control signal indicating when pseudo errors are detected and when the pseudo error occurrence in an error-free reception is below a predetermined condition. A pseudo error defines an instant when a right bit or symbol decision was made, but the margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The radio system also includes, at a transmitting end, second means for adjusting transmission power responsive to the control signal by decreasing the transmission power when the pseudo error occurrence in the error-free reception does not fulfill the predetermined condition and by increasing the transmission power when the pseudo error occurrence fulfills the predetermined condition.

Claim 27 includes many features similar to those recited in claim 24, but recites a radio receiver configured to monitor pseudo error occurrence.

Claim 28 recites a radio transmitter configured to adjust transmission power responsive to a control signal. The control signal indicates when pseudo errors are

detected in a receiver and when pseudo error occurrence in the receiver is below a predetermined condition for an error-free reception. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The transmission power is adjusted by decreasing the transmission power when the pseudo error occurrence does not fulfill the predetermined condition and by increasing the transmission power when the pseudo error occurrence fulfills the predetermined condition.

Claim 29 recites a control unit for a transmitting end of a radio link system. The control unit is configured to set an initial value of transmission power so that no pseudo errors are detected in a received signal in a receiving end of the radio link system. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The control unit also is configured to adjust the transmission power responsive to a power control message received in the control unit by decreasing the transmission power when pseudo error occurrence in an error-free reception does not fulfill a predetermined condition and by increasing the transmission power when the pseudo error occurrence fulfills the predetermined condition. The power control message is based on information on pseudo errors detected in the received signal in the receiving end and provides indication whether pseudo error occurrence in an error-free reception fulfills the predetermined condition.

Claim 30 recites a control unit for a receiving end of a radio link system. The control unit is configured to produce and send a power control message based on information on pseudo errors detected in a received signal and indicating whether pseudo error occurrence in an error-free reception fulfills a predetermined condition. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur.

Claim 31 includes features that were similar to those recited in claim 29, but is drawn to a computer program embodied on a computer readable medium. Claim 32 includes features that are similar to those recited in claim 30, but is drawn to a computer program embodied on a computer readable medium.

Claim 33 recites a method for controlling transmission power in a radio link system. The method includes sending a digital signal. The method also includes setting an initial value of transmission power so that no pseudo errors are detected in a received signal in a receiving end of the radio link system. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The method also includes receiving a power control message, which is based on information on pseudo errors detected in the received signal in the receiving end and indicating whether pseudo error occurrence in an error-free reception is below a predetermined condition. The method also includes decreasing the transmission power from the initial value when the

pseudo error occurrence in the error-free reception does not fulfill the predetermined condition. The method also includes increasing the transmission power when the pseudo error occurrence fulfills the predetermined condition.

Claim 34 recites a method for controlling transmission power in a radio link system. The method includes receiving a digital signal. The method also includes monitoring pseudo error occurrence in the received signal. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. The method also includes producing a power control message based on information on pseudo errors detected in the received signal and indicating whether pseudo error occurrence in an error-free reception fulfills a predetermined condition. The method also includes sending the power control message to a transmitting end of the radio link system.

As discussed in the specification, examples of the present invention enable the control of transmission power to be based on detecting pseudo errors in the transmission. Thus, situations are identified that are estimated as an error that nearly happened, but did not. For example, an error-free reception is provided that is monitored for pseudo error occurrence in the received signal. The pseudo error defines an instant when a right bit or symbol decision is made, but a margin for the right bit or symbol is smaller than a limit value so that an actual error nearly occurred. An actual error, however, did not occur. It is respectfully submitted that the cited reference of Endo fails to disclose or suggest all

the elements of any of the presently pending claims. Therefore, Endo fails to provide the critical and unobvious advantages discussed above.

As discussed in previous responses, Endo relates to a transmission power control apparatus for a mobile communication system. Endo describes providing a reverse channel error rate judgment section in a radio base station for judging a communication quality of the reverse channel by a detected reverse channel frame error rate. Referring to Figure 1 of Endo, decoder section 105 performs data error detection in a receiving signal digitized by the digital demodulation section 101, and outputs the result of detected errors to reverse channel error rate judgment section 103. Endo describes, if a report is received indicating a frame error rate of the forward channel being unfavorable, then the transmission power of the forward channel is to be increased. If the report indicates a frame error rate report being too favorable, then the transmission power of the forward channel is decreased to reduce interference.

Applicants submit that Endo fails to disclose or suggest all the features of claims 12-17, 19, 23-24 and 27-34. For example, applicants submit that Endo fails to disclose or suggest setting an initial value of the transmission power so that no pseudo errors are detected, and decreasing the transmission power gradually from the initial value when the pseudo error occurrence in an error-free reception does not fulfill a predetermined condition, or increasing the transmission power by a predetermined amount when the pseudo error occurrence in the error-free reception fulfills the predetermined condition. Applicants submit that Endo fails to disclose or suggest a pseudo error as claimed. For

example, according to claim 12, a pseudo error is defined as “an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur. Applicants submit Endo fails to disclose or suggest this feature.

Applicants submit that the Office Action appears to incorrectly consider a pseudo error to be the same as an actual error. Applicants also submit that Endo describes observing actual errors and not pseudo errors. Endo fails to disclose or suggest those instances where an error almost occurred, but did not. Thus, applicants submit that Endo does not decrease or increase transmission power according to pseudo errors. In contrast, Endo describes making changes in transmission power based on a frame error rate, which is based on actual errors. Endo sets the error rate to a predetermined level according to observations on actual error rates by counting errors that did occur. Endo does not set any thresholds or values according to errors that did not occur. The error rates of Endo are determined by performing data error detection and collecting data errors in the received signals. Thus, applicants submit that Endo fails to disclose or suggest at least these features of the presently pending claims.

Applicants also submit that Endo fails to disclose or suggest decreasing or increasing the transmission power when the pseudo error occurrence in an error-free reception does or does not fulfill a predetermined condition. Endo describes using actual error rates in receptions. As discussed in Endo, “decoder section 105 performs a data error detection in a receiving signal digitized by the digital demodulating section 101, and

outputs the result of detected errors to a reverse channel error rate judgment section 103,” at column 11, line 56, to column 12, line 2. Thus, Endo uses detected errors to extract a frame error rate and then Endo adjusts transmission power. Applicants submit that Endo does not take into account the non-occurrence of errors in extracting the frame error rate. Endo, therefore, fails to use an error-free reception in extracting the frame error rate.

In contrast, claim 12 recites “decreasing the transmission power gradually from the initial value at the transmission end when the pseudo error occurrence in an error-free reception does not fulfill a predetermined condition” or “increasing the transmission power by a predetermined amount when the pseudo error occurrence in the error-free reception fulfills the predetermined condition.” Claim 24 also recites these, and other, patentable features of claim 12, but is drawn to a radio system. Claim 27 recites “when the pseudo error occurrence in an error-free reception is below a predetermined condition.” Claim 28 also recites these, and other, patentable features of claim 27, but is drawn to a radio transmitter configured to adjust transmission power responsive to a control signal.

Claim 29 recites “decreasing the transmission power when pseudo error occurrence in an error-free reception does not fulfill a predetermined condition” and “increasing the transmission power when the pseudo error occurrence fulfills a predetermined condition.” Claim 30 recites to “send a power control message based on information on pseudo errors detected in a received signal and indicating whether pseudo error occurrence in an error-free reception fulfills a predetermined condition.” Claim 31

includes these, and other, patentable features of claim 29, but is drawn to a computer program embodied on a computer readable medium. Claim 32 includes these, and other, patentable features of claim 30, but is drawn to a computer program embodied on a computer readable medium. Claims 33 and 34 recite “indicating whether pseudo error occurrence in an error-free reception is below a predetermined condition.” Applicants submit that Endo, based on the reasons given above, fails to disclose or suggest at least these features of the presently pending claims. Applicants respectfully request that the anticipation rejection of claims 12-17, 19, 23-24 and 27-34 be withdrawn.

Claims 18 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Endo in view of U.S. Patent No. 5,873,028 (Nakano et al.). The Office Action took the position that Endo taught all the elements of claims 18 and 20 except wherein a predetermined step is 1 dB. Nakano was cited as providing these elements of claims 18 and 20 missing from Endo. Applicants respectfully traverse the obviousness rejection and submit that the cited references, either alone or in combination, do not disclose or suggest all the features of any of the presently pending claims.

Claims 18 and 20 depend directly or indirectly from independent claim 12. Claim 12 is summarized above. Applicants submit that claims 18 and 20 recite the patentable features of claim 12.

Endo is summarized above, and applicants submit that Endo does not disclose or suggest all the features of claims 18 and 20 for at least the reasons given above with

regard to claim 12. Applicants also submit that claims 18 and 20 recite additional patentable features that are not disclosed or suggested by Endo.

Nakano relates to transmission power control apparatus and method in a mobile communication system. Nakano describes suppressing the transmission power to an absolute necessary minimum level and increasing subscriber capacity by reducing an amount of interference. For example, the transmission power of a first mobile station 1a is controlled such that a difference between a reception CIR at first base station 3a with respect to first mobile station 1a and first base station target CIR becomes smaller, while the transmission power of the second mobile station 1b is controlled such that a difference between a reception CIR at first base station 3a with respect to second mobile station 1b and a second base station target CIR becomes smaller.

Applicants also submit that Nakano, either alone or in combination with Endo, does not disclose or suggest those features of the claims missing from Endo. For example, applicants submit that Nakano does not disclose or suggest decreasing the transmission power gradually from the initial value at the transmission end when the pseudo error occurrence in an error-free reception does not fulfill a predetermined condition or increasing the transmission power by a predetermined amount when the pseudo error occurrence in the error-free reception fulfills the predetermined condition, as discussed above. Nakano does not disclose or suggest using pseudo error occurrences for controlling the transmission power. Instead, Nakano describes reducing a difference between a reception CIR and a base station target CIR among mobile and base stations.

This aspect of Nakano does not disclose or suggest decreasing or increasing the transmission power when the pseudo error occurrence in an error-free reception does or does not fulfill a predetermined condition. Thus, applicants submit at least these features are not disclosed or suggested by the cited references, either alone or in combination.

Further, claims 18 and 20 depend directly or indirectly from claim 12. If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. MPEP 2143.03. Because independent claim 12 is nonobvious, claims 18 and 20 also are nonobvious. Thus, for at least these reasons, applicants submit that claims 18 and 20 are not disclosed or suggested by Endo and Nakano, either alone or in combination. Applicants respectfully request that the obviousness rejection of claims 18 and 20 be withdrawn.

Claims 21-22 and 25-26 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Endo in view of U.S. Patent No. 5,878,329 (Mallinckrodt). The Office Action took the position that Endo taught all the elements of claims 21-22 and 25-26 except using forward error correction in the transmitted signal, decoding the signal at the receiving end by means of a forward error correction decoder, and interpreting the correction made by the forward error correction decoder as pseudo errors. Mallinckrodt was cited as providing the elements of claims 21-22 and 25-26 missing from Endo. Applicants respectfully traverse the obviousness rejection and submit that the cited references, either alone or in combination, do not disclose or suggest all the features of any of the presently pending claims.

Claims 21-22 depend directly from claim 12. Claim 12 is summarized above. Applicants submit that claims 21-22 recite the patentable features of claim 12, as well as other features.

Claims 25-26 depend directly from claim 24. Claim 24 is summarized above. Applicants submit that claims 25-26 recite the patentable features of claim 24, as well as other features.

Endo is summarized above, and applicants submit that Endo does not disclose or suggest all the features of claims 21-22 and 25-26 for at least the reasons given above with regard to claims 12 and 24. Applicants also submit that claims 21-22 and 25-26 recite additional patentable features that are not disclosed or suggested by Endo.

Mallinckrodt relates to a power control of an integrated cellular communications system. Mallinckrodt describes the power controlled by monitoring the bit error rate and the signal-to-noise ratio. Mallinckrodt describes controlling the power output levels of transmitters to a minimum necessary for satisfactory communications. Each transmission includes a code representative of the transmitter output level. The receivers compare this code to the received signal strength and adjust their associated transmitter power output levels accordingly. The bit error rate and the signal-to-noise ratio are monitored by receivers to develop a measure of signal quality.

Applicants submit that Mallinckrodt, either alone or in combination with Endo, fails to disclose or suggest the features of the claims missing from Endo. For example, applicants submit that Mallinckrodt does not disclose or suggest decreasing the

transmission power gradually from the initial value at the transmission end when the pseudo error occurrence in an error-free reception does not fulfill a predetermined condition or increasing the transmission power by a predetermined amount when the pseudo error occurrence in the error-free reception fulfills the predetermined condition, as discussed above. Mallinckrodt does not disclose or suggest using pseudo error occurrences for controlling the transmission power.

Applicants submit that Mallinckrodt, like Endo, describes detecting actual errors in monitoring the bit error rate and signal-to-noise ratio. The described monitoring of Mallinckrodt does not disclose or suggest setting an initial value of the transmission power so that no pseudo errors are detected. Further, Mallinckrodt does not disclose or suggest decreasing or increasing the transmission power based upon the occurrence of the pseudo errors fulfilling or not fulfilling a predetermined condition. Thus, the cited references, either alone or in combination, do not disclose or suggest at least these features of the claims.

For at least these reasons, applicants submit that claims 21-22 and 25-26 are not disclosed or suggested by Endo and Mallinckrodt, either alone or in combination. Applicants respectfully request that the obviousness rejection of claims 21-22 and 25-26 be withdrawn.

Claim 35 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Endo in view of U.S. Patent No. 5,822,318 (Tiedemann, Jr. et al.). The Office Action took the position that Endo taught all the features of claim 35 except a first output

for outputting a corrected bit stream, wherein the corrected bit stream is obtained by removing redundancy from a received bit stream, and a second output for outputting an error signal indicating corrections made by the forward error correction decoder to obtain the corrected bit stream. The Office Action then alleged that Tiedemann provided the elements of claim 35 missing from Endo. Applicants respectfully traverse the obviousness rejection and submit that Endo and Tiedemann, either alone or in combination, fail to disclose or suggest all the features of any of the presently pending claims.

Claim 35 recites a forward error correction decoder for a radio link system. The forward error correction decoder includes a first output for outputting a corrected bit stream. The corrected bit stream is obtained by removing redundancy from a received bit stream. The forward error correction decoder also includes a second output for outputting an error signal indicating corrections made by the forward error correction decoder to obtain the corrected bit stream. The error signal provides information for producing a control signal. The control signal indicates whether pseudo errors are detected in a received signal and whether the pseudo error occurrence in an error-free reception fulfills a predetermined condition. A pseudo error defines an instant when a right bit or symbol decision was made, but a margin for the right bit or symbol decision was smaller than a limit value so that an actual error did not occur.

Endo is summarized above.

Tiedemann relates to a method and apparatus for controlling power in a variable rate communication system. Tiedemann describes providing for a closed loop power control method. A first remote station controls the transmission power of a second remote station by transmitting a rate dependent power control signal to the second remote communication station. Because only the second communication knows its transmission rate a priori, it determines its course of action in accordance with both the received power control signal and the knowledge of its transmission rate. Forward error correction decoder 44 of Tiedemann determines an indication of error rate and provides a signal indicative of the error rate to control processor 46. Tiedemann also describes a decoder 56 that has two outputs. Decoder 56 separates two transmitted signals from received data where a second output is for outputting a second signal encoded in the transmission at a transmitting end.

Applicants submit that Endo and Tiedemann, either alone or in combination, fail to disclose or suggest all the features of any of the presently pending claims. For example, applicants submit that Endo and Tiedemann fail to disclose or suggest a control signal indicating whether pseudo errors are detected in a received signal and whether the pseudo error occurrence in an error-free reception fulfills a predetermined condition. As discussed above, Endo describes extracting a frame error rate from a signal, and fails to disclose or suggest determining pseudo error occurrences in an error-free reception. Thus, applicants submit that Endo fails to disclose or suggest at least this feature of claim 35.

Further, applicants submit that Tiedemann, either alone or in combination with Endo, fails to disclose or suggest the features of claim 35 missing from Endo. As noted above, Tiedemann describes an indication of an error rate and provides a signal indicative of the error rate to control processor 46. Tiedemann describes determining a course of action according to a received power control signal having power control data based on the error rate. Using an error rate, applicants submit that Tiedemann fails to detect pseudo errors in an error-free signal. In contrast, claim 35 recites “the control indicating whether pseudo errors are detected in a received signal and whether the pseudo error occurrence in an error-free reception fulfills a predetermined condition.” Applicants submit that, because Tiedemann provides a signal indicating an error rate, the reference fails to disclose or suggest pseudo errors that occur in an error-free signal.

Applicants also submit that decoders 44 and 56 fail to disclose or suggest indicating corrections made by a decoder to obtain a corrected bit stream. For example, applicants submit that decoder 56 fails to disclose or suggest outputting a signal corresponding with any type of errors or, alternatively, pseudo errors. Thus, decoders 44 and 56 of Tiedemann fail to disclose or suggest a first output and a second output for outputting an error signal indicating corrections made by the forward error correction decoder to obtain a corrected bit stream. For at least these reasons, applicants submit that Endo and Tiedemann fail to disclose or suggest all the features of any of the presently pending claims. Applicants respectfully request that the obviousness rejection of claim 35 be withdrawn.


Applicants also submit that new claim 36 also is not disclosed or suggested for at least the reasons given above, and because the new claim recites additional patentable subject matter. Thus, new claim 36 is patentable over the prior art and should be allowed along with claims 12-35.

It is respectfully submitted that each of claims 12-36 recites subject matter that is neither disclosed nor suggested by the cited references. It is therefore respectfully requested that all of claims 12-36 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Additional Claim Fee Transmittal